ART. V. — 1. *An Elementary Treatise on Logic, including Part I. Analysis of Formulæ, Part II. Method; with an Appendix of Examples for Analysis and Criticism, and a Copious Index of Terms and Subjects.* Designed for the Use of Schools and Colleges, as well as for Private Use. By W. D. WILSON, D. D., Trinity Professor of Christian Ethics, and Professor of Logic, Intellectual Philosophy, and History, in Hobart Free College, at Geneva, N. Y. New York: D. Appleton & Co. 1856. 12mo. pp. 425.

2. *Elements of Logic, together with an Introductory View of Philosophy in General, and a Preliminary View of the Reason.* By HENRY P. TAPPAN. New York: D. Appleton & Co. 1856. 12mo. pp. 467.

3. *An Outline of the Necessary Laws of Thought; a Treatise on Pure and Applied Logic.* By WILLIAM THOMPSON, M. A., Fellow and Tutor of Queen's College, Oxford. Third Edition, much enlarged. London: Longmans. 1854. 16mo. pp. 396.

4. *Formal Logic, or the Calculus of Inference Necessary and Probable.* By AUGUSTUS DE MORGAN, of Trinity College, Cambridge, Professor of Mathematics in University College, London. London: Taylor and Walton. 1847. 8vo. pp. 336.

THIS list of recent treatises upon logic might easily have been made a longer one. The number of such publications is one significant intimation among many, that the study of this noble science is rapidly recovering the high estimation in which it was once held as a means of intellectual discipline. Throughout the Middle Age, and down even to the time of Locke, the study of logic was one of the chief objects of attention at all the universities in Europe. It formed the porch through which the neophyte was led to his initiation into the mysteries of scholastic theology and metaphysics. Whatever there was of good in the intellectual training of the scholars and philosophers of those days, was due chiefly to the patient and thorough drilling which they received in the abstruse formulas of this science. To wrestle with syllo-

gisms was the principal gymnastic exercise of the academic youth; and the vigor of intellectual muscle which was thus developed, the power of grappling with the most abstruse subjects, the capacity of clear thought, nice discrimination, and forcible reasoning, which were among the results of this manly course of education, — whatever we may think of the value of the topics to which these faculties were subsequently applied, — were such as to shame the nurslings of a more effeminate treatment in later times. The hill of science was not accessible in those days by any royal road or flowery footpath. Logic was the rough passage, beset with rocks and brambles, which led straight up the precipitous ascent.

The rise of the Baconian philosophy, and the development of a taste for the elegances and refinements of letters and the arts, changed the whole method of university instruction. Useful information, not mental discipline, became the great object of education. Logic fell into neglect, because the physical sciences had made so much progress that there was now more to be taught, and less room and opportunity were left for exercises which tended only indirectly to the discovery of truth by educing and training those faculties of the mind which are engaged in the investigation. The muscles of a carpenter or a blacksmith are sufficiently hardened by his daily work; climbing masts, leaping with poles, balancing and swinging on ladders, and other prescribed feats of activity having no useful end in view except the development of the chest and the more vigorous play of the sinews and joints, are needed only by persons engaged in sedentary pursuits. Yet in defence of these merely fanciful exercises, as they may be called, it might be said, that they bring about a more uniform and harmonious improvement of all the bodily powers than could be effected by the practice of any one art or by one kind of manual labor. A blacksmith has more stalwart arms than a sailor; but he cannot grip so tightly with his fingers, or balance himself so easily on a narrow foothold at a giddy height. Gymnastic exercises, if properly planned and steadily pursued, strengthen all the muscles, and develop all parts of the body in their due proportion. The forms of the ancient Greeks, who were most addicted to them, present-

ed the finest models for sculpture, while a hard-working artisan is ungainly and often distorted in person. That culture of mind which is attained by the minute division of mental labor, and by exclusive addiction to a single pursuit, is equally one-sided and inharmonious. The intellect loses the pliancy which is its most valuable natural endowment, and excellence in one department ceases to be a test of general ability.

But the study of logic was not merely neglected; it soon came to be despised. Physical inquirers, who were actively engaged in the observation of phenomena and the discovery of general laws, learned to regard with contempt the disputations and other dialectic exercises of the schools. They affirmed, and their doctrine seemed plausible enough, that syllogistic reasoning was a means, not for the discovery of new truths, but only for the vindication of old ones against sophistry and error. If the sole business of the inquirer were to observe facts and try experiments, their position seems to be a sound one; the results thus obtained form the premises from which proper conclusions are to be deduced, and logic has nothing to do with the ascertainment of premises, but uniformly takes them for granted. The mistake of those who scoffed at dialectical science consisted in supposing that there was little probability of error in the reasoning which was based upon facts. Right observation of nature being presupposed, they held that the true interpretation was obvious, or presented little difficulty. But it is not so. We can hardly open a book upon any branch either of the moral or the physical sciences, without being struck with the number of instances of unsound and fallacious reasoning, — of true and false conclusions improperly deduced from premises correctly observed and fairly stated. It is almost enough to make a person doubt the truth of Christianity itself, to read some of the treatises which have been written expressly for its defence. The author's intentions are good, and the truths which he labors to establish actually rest upon the Rock of Ages, and are of unspeakable importance; but the arguments adduced in their support would not satisfy an inquiring child, and only afford ground for the subsequent cavillings of the sceptic.

The great defect of the literature of science at the present day, as it seems to us, is a want of clear ideas, exact method, and valid ratiocination. Forced constructions of nature's language, faulty generalizations, arbitrary and fanciful systems, multiply so rapidly, that the neophyte knows not what to believe, and is almost led to distrust the security of the foundations upon which the whole fabric of science rests. One daring theorist and skilful rhetorician, like the author of the "Vestiges of Creation," is able to confound the whole scientific world by the very boldness and magnitude of his heresies; and the work of confutation is necessarily a slow one, as every error committed in the course of it by unskilful antagonists is considered a proof of the strength of the position assailed, whereas it only demonstrates the weakness and incompetency of the besiegers. The interpretation of facts is really more difficult than the collection and arrangement of them; neither can be successfully attempted by undisciplined minds. The perceptive and the reasoning powers often exist almost in inverse ratio of each other. As theory without observation is fanciful, so observation without competent theorizing is barren and nugatory.

Still further; the truth is not so generally recognized as it should be, that correct observations and fruitful experiments presuppose well-arranged knowledge, ingenious speculation, and accurate reasoning. An hypothesis has been aptly defined to be "the only reason for making one experiment rather than another." Facts are of no immediate use for the purposes of science, except they directly tend to substantiate or refute some doctrine which has been previously guessed at, under the guidance only of a remote analogy or a hasty induction from obvious instances; of no *immediate* use, we say, because unquestionably a record of observations made by untrained eyes, and, for the time, with no definite purpose, may subsequently present to abler inquirers the seeds of important discoveries. But this business of *mere* observation has sometimes, as in meteorology, been carried much too far, the difficulty of arriving at any general results being only increased by the undue multiplication of details. To ask questions at random, or to multiply them without limit, is no

proper mode of eliciting the truth from witnesses on the stand, or of compelling Nature to disclose her secrets. To accomplish either of these ends, the queries must be few, definite, and to the purpose. *Prudens interrogatio dimidium scientiæ est*, says Lord Bacon. Before you can question Nature successfully, you must have a shrewd suspicion what her answer will be. It is not true that the business of discovery *begins* with observation or experiment. The inquirer first forms a number of guesses, one after another, as possible explanations of the phenomena or solutions of the problem. Most of these are rejected as soon as formed, a little reflection and reasoning being sufficient to show their unfitness or inadequacy to represent the facts, or to clear away the difficulty. A few others, which escape or withstand this preliminary examination, are afterwards eliminated by the test of observation or experiment, the final discovery being the confirmation of that hypothesis which passes triumphantly every ordeal to which it can be subjected. The conditions of success in such an undertaking are quickness and ingenuity in framing hypotheses, and the nice conduct of the reasoning powers by which truth is readily separated from error. It is not enough to inculcate the necessity of making observations; the tyro must learn *what* to observe, and *how* to observe, or his labor will be thrown away.

The neglect of logical science was a consequence of the rise and spread of the Baconian philosophy, though it arose from a misconception of the teachings of its founder. The most valuable portion of the inductive method, as he expounds it, consists in the rules which it furnishes for the proper discipline of the intellectual faculties, and for removing the causes of error, before we come to the work of observation. "*Mere* experience," says the Novum Organon, "which is said to be accidental when it comes unsought, and is called *experiment* when it is the work of design, is only taking things out of their due order and connection, and thus rendering them useless; it amounts only to groping in the dark, as when men try to find their way in the night-time by the feeling of surrounding objects; a better and wiser course would be to wait for the dawn, or to light a candle, and thus to ascertain the right

direction." But as Bacon first systematized the inductive process, which rises from particular observations to general laws, inquirers easily fell into the mistake of supposing that observation and the accumulation of facts are the sole means of discovery, and that any previous training of the intellect in dialectic exercises is needless or injurious. The Baconian was believed to controvert the Aristotelian logic, when, in truth, it only determines its domain, and confines it to its proper objects. Yet this mistake was continued by the teachings of Hobbes and Locke, and, in later times, by the Scotch metaphysicians, Reid, Stewart, and Campbell, who never speak of the syllogistic method except to sneer at it, and to deprecate its revival in the schools.

The revival of the study of logic in our own day, so far as it did not originate in a reaction from the abuse of the inductive system, and in weariness at the undue multiplication of details, is attributable chiefly to the teachings of Bishop Copleston and Archbishop Whately. The former published little or nothing upon the subject, but he taught in the University of Oxford with singular ability and success; and the latter, who was his pupil, gratefully and modestly gives him credit for rendering so much aid in the preparation of the treatise which passes under Whately's name, that the merit of the work may be equally divided between them. And the merit in this case was great. Whately modernized the study of the science, not by stripping it of its technicalities, which are part and parcel of the subject, as much so as chemical nomenclature is of chemistry, but by drawing the illustrations and applications of the doctrines and rules from modern subjects, by adapting them to the present state of the sciences, and thus giving an air of novelty, grace, and immediate interest to what had previously appeared harsh, antiquated, and obscure. Sir William Hamilton, a most competent judge, and one by no means inclined to think favorably of Whately's merits, says that by the publication of Whately's *Elements* "a new life was suddenly communicated to the expiring study," and that the decade of years in which it first appeared had "done more in Oxford for the cause of this science than the whole hundred and thirty years preceding."

Since that decade, the writings of Mr. Thompson, Mr. Mansel, Mr. De Morgan, and, above all, of Sir William Hamilton himself, have nobly carried out the work which Copleston and Whately began, and raised the study of logic to a chief place in eminence and popularity among proper academic pursuits.

The revival was not confined to England, but extended to the colleges in this country. The study of Whately's *Elements* here almost immediately superseded that of Hedge's *Logic*, a little compend which did not profess to give more than a few definitions of the most frequently recurring technicalities of the science. The subject now enters into the required course in almost every college in the Union, and is beginning to be taught even in our academies and high schools. More gratifying still, the two publications first named at the head of this article afford proof that the attention of American scholars and thinkers is now seriously directed to the cultivation of logical science, and that some of them are abundantly able to enter into a generous rivalry with the labors of their English brethren in the same department. The tone which English and American writers now adopt in reference to this branch of academic learning is no longer defensive and apologetic, as that of Whately was thirty years ago. They speak of its high claims as admitted by all who are competent to form an opinion of the relative importance of the different departments of philosophy, and the comparative usefulness of the various exercises in which academic youth are engaged.

Mr. Tappan's book, the second on our list, is but a republication, with corrections and some enlargement, of his work which originally appeared twelve years ago. As the title-page imports, it is rather a treatise on metaphysics, or philosophy in general, than a specific compend of logical science. The preliminary matter occupies one third of the book, the remainder of which is devoted to a consideration of logic in the largest acceptation of that term, including the inductive as well as the deductive method, together with the doctrine of evidence, and what the author calls "primordial logic," or a brief summary of metaphysical notions and of the regulative principles which form the basis of all the sciences. The Aris-

totelian logic, or what is usually called the science of dialectics, occupies but one of the four books which constitute Part III. of Mr. Tappan's treatise, so that we have only the outlines of the subject, treated with great conciseness. Brief as this summary is, it is drawn up with much clearness and method, and will be valuable to that class of pupils — a small one, it is true — who do not need to have the dry bones of abstruse science covered with illustrations and other explanatory matter, before they can engage in the study with interest and profit.

A nable work on the freedom of the will, published by the same author some years ago, proves that his tastes are those of a metaphysician rather than a logician. An original thinker and a vigorous reasoner, his style, though correct and lucid, is too concise and dry to be well adapted to the purposes of learners. It was natural that he should understand logic in so wide a sense as to include the greater part of metaphysical science. But precision and a just regard for the measuring of words as determined by long-established usage require a narrower definition of logic. The sciences can be kept distinct from one another only by restricting them within the most limited signification of the names which they bear. Logic can be distinguished from psychology and metaphysics on the one hand, and from the philosophy of the inductive sciences on the other, only by adopting that definition which is indicated in the title of Mr. Thompson's work, and calling it *the science of the necessary laws of thought.* It does not concern *what* we think, but *how* we think; its business is not with the *matter*, but with the *forms* of thought, — with the modes in which our thoughts *must* be evolved when we think correctly, or with due reference to the necessary laws which regulate our mental processes when these are pure and unmixed, that is, when we have no reference to the objects about which they are concerned. It does not examine the correctness either of the premises or the conclusion, but only of the process by which we pass from the one to the other. It recognizes, therefore, only three faculties of mind; — *simple apprehension*, by which we form conceptions of the meaning of terms; *judgment*, by which we unite these terms into proposi-

tions so as to affirm or deny; and *the reasoning faculty* (not *the reason*, but the power of inference), by which we deduce one proposition from another. The logician does not even undertake to analyze these three faculties of mind: that is the business of the psychologist. Neither does he examine the objects or ideas about which they are conversant: that is the office of the physicist, the observer, and the metaphysician, who prepare the data of knowledge, or the materials of the several sciences. "Logic," says Lord Bacon, whose doctrine in this respect has been greatly misapprehended,—"logic does not pretend to invent sciences, or the axioms of sciences, but passes it over with a *cuique in suâ arte credendum*." But the logician points out *the laws* of these several processes of thought, or the manner in which they must be performed when we think correctly.

We doubt whether even the inductive method, though it is certainly a process of *inference*, can be rightfully included within the domain of logic. So far, indeed, as *induction* is simply the converse of *deduction*, — that is, so far as the induction is perfect, or comprehends *all* the cases, — it is a logical process; for the conclusion to which it leads us is a *necessary* inference, so that the process by which it is obtained is ranked among the necessary laws of thought. But as the word is commonly understood, this is no induction at all, but only a summing up of the details of knowledge into one general statement. Induction, properly so called, is always incomplete; it infers that to be true of a whole class which it knows to be true only of certain individuals in that class. And this process, though it may often be legitimate, is always illogical; for it is never a *necessary* inference. Even the question whether it be legitimate or not, can be determined only by reference to the subject-matter of the particular induction, and not by any general maxim deducible from the necessary laws of thought, and therefore applicable to all inductions. If I find, from three or four experiments, that as many different masses of iron are fused at a given temperature, it is a legitimate induction to infer that all iron will melt at that heat. But when I have found that three or four neutral salts are soluble in water, I cannot infer that *all* neutral salts are thus

soluble. Yet these two inferences are precisely alike in *form;* and as logic has concern only with the *forms* of thought, they are either both logical or both illogical. In fact, they are both illogical, and it is the nature of the subject-matter which renders the one legitimate and the other illegitimate.

Dr. Wilson's work is elaborate and thorough, covering more ground even than Dr. Whately's, and leaving nothing to be desired by those who wish to obtain a full knowledge of the subject. It is only in a modified sense that originality can be affirmed of a work on the elements of logic; just as any treatise on the elements of geometry must, in all its main features, be a reproduction of Euclid. But the book before us is much more than a compend of what others have written upon the same theme. The writer shows that he is fully acquainted with the literature of the subject, and has fairly digested together the fruits of his reading and meditation, till the whole has assumed shape and order in the form most natural to his own mind, and best adapted to the wants of students. The work is exact and thorough, without being painfully minute or abstruse; and the illustrations are drawn from so wide a field of literature and general science, or appear so often as the fruit of ingenious original speculation, that they give an air of variety and animation even to the discussion of dry technicalities. Mainly designed as a text-book of instruction in schools and colleges, Dr. Wilson's book is far superior to the compilations which are generally made for such a purpose. It is an independent and valuable contribution to the science of which it treats, and will be best appreciated by those who are already fully conversant with its details.

Adopting that view of the nature and the province of logic which we have just explained, Dr. Wilson defines it as *the science of deductive thinking*, and thus postpones to the Second Part of his treatise the consideration of what is usually called Applied Logic, though it is here divided into several branches, which are denominated Logical Methods. It is in this portion of his work that a vein of original speculation most frequently appears; and here also we may find cause to dissent from some of the author's conclusions, though always recognizing the ability and fairness with which they are pre-

sented. Not having space for a detailed examination of the work, we can only give a few desultory comments on those portions of it which seem most to invite criticism.

We think Dr. Wilson dismisses rather too summarily Sir William Hamilton's doctrine of the thorough quantification of the predicate, the most extensive and important innovation in the theory of formal logic which has been proposed since the time of Aristotle. This hasty rejection of it seems to have arisen from overlooking Hamilton's simple postulate, that logic requires us *to state explicitly whatever is thought implicitly*, — a postulate which lies at the very foundation of the science. Though the quantity of one of the terms is invariably omitted in the verbal statement, yet if it is always understood in thought, we ought logically to take it into account, however uncouth and unnatural the proposition may appear in its formal expression, — even though, as Dr. Wilson says, it may seem to be only "got up for the purpose of seeing what one can do." This is admitted in respect to the quantification of the subject. Thus the proposition, *indefinite* in form, that

Common salt is chloride of sodium,

is admitted to be *universal* in fact; for in thought we distribute the subject, and understand the meaning to be

All common salt is chloride of sodium.

Is it not equally evident, that in this instance, and in all similar ones, we also distribute the predicate in thought, knowing the converse of the proposition to be true, or that all chloride of sodium is common salt? The complete *logical* expression, therefore, is,

All common salt is *all* chloride of sodium;

for this is what every one understands the meaning of the original proposition to be.

We cannot admit the force of Dr. Wilson's objection to this reasoning, that, "in forming the judgment, the *sphere* [extension]* of the Predicate is not at all before the mind, or

* Technicalities ought not to be multiplied in logic, where they are already so numerous as to obstruct the popularity and usefulness of the science. And we hold, also, that they ought not to be altered without urgent reason, inasmuch as readers

consciously in the thoughts"; but that, "on the contrary, we use the predicate as a general term — with reference to its Essentia, and not its sphere." In other words, he maintains that, in the proposition just cited, we think only of *the characteristic qualities* (the comprehension) of "chloride of sodium" when we affirm its identity with common salt, and not of *the number of individual parcels* (the extension) included under the name. We maintain, on the contrary, that, in every case of a perfect or adequate definition, — that is, when the definition is precisely applicable to the thing defined, *and to nothing else*, — we *do* think of the extension of the predicate; we have it "consciously in the thoughts," as otherwise we could not distinguish an adequate from an inadequate definition. The proposition,

Man is an animal,

if considered as a definition, is an inadequate one, for the name "animal" includes many other creatures besides man, and therefore we think not *how many* others it includes, but think only of those *attributes* belonging to animal which belong also to man. But the definition,

Man is a reasoning biped,

is recognized by us as adequate only because we perceive that *every* reasoning biped is a man. We cannot help thinking the predicate as distributed.

Thus much for the quantification of the predicate in affirmative propositions. That in negative propositions, also, the predicate is sometimes particular, is more difficult to be

---

are thereby compelled to learn the nomenclature over again, besides having their old associations and recollections unpleasantly broken up. Dr. Wilson uses *sphere* to denote the number of individuals included under a common name; and he explains this comparatively novel term as synonymous with the familiar epithet *comprehension*. He uses *matter* to signify the properties or attributes which are common to the individuals belonging to the species, and explains it as synonymous with *intension*. Now we believe the usage of all the old logical writers is to employ *extension* to signify the number of individuals ranked together in a class, and *comprehension* to stand for the attributes common to that class; and hence the old axiom in logic, as Dr. Reid phrases it, that "the *more extensive* any general term is, it is the *less comprehensive;* and, on the contrary, the *more comprehensive*, the *less extensive*." Dr. Whately, indeed, for etymological reasons, prefers that these two terms should change meanings with each other; but even he does not venture to make the innovation which he recommends.

proved, but is not less certain. The proposition that

1. Oaks are not Maples

is made with a tacit reference to another proposition, that

2. Both Oaks and Maples are trees;

otherwise, it would be as frivolous and unmeaning as to say that an oak is not a star, or not anything else with which it has not the remotest connection or affinity. But if the first proposition tacitly, or in thought, carries the second proposition along with it, then the logical postulate that we must state explicitly whatever is thought implicitly, requires us to put the first proposition in this form: —

Oaks are not *some* trees, — that is, not Maples;

and this is a valid negative proposition with a particular predicate.

Dr. Wilson attempts to refute this conclusion by a sort of mathematical *reductio ad absurdum*, which we consider to be unintentionally sophistical and unsound. Of course, an undistributed term may have different meanings in two different propositions; — "*some* trees" may mean Oaks in one case, and Maples in another. But availing himself of the fact that the same expression is used in the two cases, Dr. Wilson says, Let "some trees" = P. Then, according to what has just been proved,

Oaks are not P;

but as they are confessedly one kind of trees, it follows that

Oaks are P.

Hence, as two things which are equal to the same thing are equal to each other,

P = not P,

which is a contradiction. But this absurdity is not confined to an undistributed predicate: it may be made to appear in the case of an undistributed subject. For instance, no one denies that these two propositions are valid:

"Some trees" are Oaks,

and

"Some trees" are Maples.

Hence, by virtue of the same axiom, Oaks are Maples, which is absurd. In truth, the absurdity in both cases arises from

the unrestricted application of mathematical processes to logical formulas, an illegitimate proceeding which Dr. Wilson himself elsewhere justly reprehends. He says, in his Preface: "Units have no individual properties, — nothing to distinguish one from another. Much less have they any separable accidents." "But the words used in Logic," he continues, "represent the conceptions that we form of objects of thought, which are not units merely, but individuals also, having each of them inseparable and peculiar properties of their own, upon which not only their adequate conception, but any use which we can make of that conception in the Formula, whether of mediate or of immediate deduction, depends."

The particular criticism here is good, but the manner in which it is applied to the censure of De Morgan's whole work seems to us too sweeping. The accomplished Professor of Mathematics in University College has been sometimes betrayed into the error which all practised mathematicians are apt to commit, of importing into the province of contingent matter, or probable reasoning, the habits of thought which they have formed by their familiarity with necessary matter, or demonstrative reasoning. But this error is far from being universal, or from vitiating his whole work, which seems to us to contain a greater number of acute and original remarks upon the theory of formal logic, and even of positive additions to that theory, than the publications of any other English writer during the present century, Sir William Hamilton alone excepted. The criticism is not even directly applicable to his doctrine of "the numerically definite syllogism," which is the capital feature of his work. This is a curious addition to the theory of logic, having no practical utility, it is true, and being of interest chiefly to mathematicians, for, without some previous mathematical training, it is hardly intelligible; and yet it is strictly legitimate and valid, and a knowledge of it will amply repay the trouble required for mastering its details.

We must object, however, to Professor De Morgan's style, which has at times an intolerable air of smartness and self-sufficiency, especially when he is treating of subjects which he either knows nothing about, or in relation to which he has been irritated by controversy. Very likely he mistakes this

smartness for wit; but it is a blunder which will never be shared by his readers. We will quote but one instance. He has quarrelled with metaphysics, simply because he has been sharply attacked by the most eminent metaphysician of his day, Sir William Hamilton. He remarks (Formal Logic, p. 27), that "there are no writers who give us so much *must* with so little *why* as the metaphysicians." And he goes on to express a formal doubt respecting the uniformity of process in different minds, grounded on the analogy, that, if persons who had seen only the outside of a timepiece were to invent machines to answer its purpose, they might accomplish the object in several different ways, as by a weight or a spring, and by various forms of escapement. "Are we *sure*," he asks, "that there are not differences in our minds, such as the preceding instance may suggest by analogy; if so, *how* are we sure?" He adds, however, with mock candor, —

"I would not dissuade a student from metaphysical inquiry; on the contrary, I would rather endeavor to promote the desire of entering upon such subjects: *but I would warn him, when he tries to look down his own throat with a candle in his hand, to take care that he does not set his head on fire.*"

For a multitude of similar instances, see the whole chapter on Fallacies, which in other respects is excellent.

But to return to Dr. Wilson. In discussing the relation of cause and effect, we are told by him, that "*whatever we know by its own properties directly* we always know and conceive of as *effect;* and the mind *of necessity* refers to something else as the ground and cause of its being." The Italics here are our own. We cannot accept the definition, or admit the existence of any such law of thought as it implies. Mere aggregations of inorganic matter, as it seems to us, are not necessarily recognized as *effects;* there are no physical or metaphysical reasons, but only theological ones, for rejecting the doctrine of the atheist, that, so far as we know, they may have existed for ever. A mere stone, a shapeless clod, seems to embrace within itself all the conditions of its own existence. As it continues to be, seemingly without requiring any exertion of power to keep it in being, so it may have existed through an indefinite period, or without any beginning.

There is no law of thought, not even any bias of mind, which requires us to assign to it an absolute commencement, or a cause of being exterior to itself. Though we earnestly repudiate the doctrine maintained by some, that the Deity was only the Architect of the universe, and not, in the strict sense of the word, its Creator, we reject it only on theological grounds; philosophical reasons for or against it we cannot find. Certainly no imperative law of thought compels us to recognize the stone as an effect.

The true law of causation is, that every *event* must have a cause. If the stone began to be, if time was when it was not, then we must assign a cause, not of its existence, but of its beginning of existence. Still further, if any change, even the slightest, takes place in it or in its position, the mind *of necessity* refers such change to an adequate cause. The child or the savage, just as positively as the educated and reflecting man, demands a cause for every phenomenon which *begins* within the sphere of his observation, or to which, on adequate evidence, he assigns a beginning. But he does not demand a cause of being for shapeless and unchanging matter, and the question whether it be an effect or not, never occurs to him. If his attention is excited by some strange sound of unknown origin, and you affirm that *nothing* caused it, he will not believe you. But attempt to teach him either doctrine respecting the existence of mere brute matter, — that it was created, or that it has existed for ever, — and if he can be made to understand the question, which is doubtful, he will adopt either belief with indifference.

"Realities, or things real," says Dr. Wilson, "have also been distinguished into two classes: *the Realities of Being* and *the Realities of Truth.* Mind, and all the forms of material existence, are" ranked under the former head; "certain objects of thought, as time, space, the point, the line, &c., and the first axioms of all knowledge," are put in the latter class. The reason assigned for placing them there is, that they "have no *substantial* existence, and from their very nature they can have none." It is said, also, that they are not "considered as merely the properties of any substance, whether material or immaterial"; but "justice, virtue, &c." are not

ranked in this class, because they "exist only as properties of some intelligent being."

Here seems to be some confusion of thought, and we do not know whether to ascribe it to Dr. Wilson, or to some other author from whom his language seems to imply that he has cited it. But at any rate, it is his by adoption. In the first place, time and space are not properly classed with lines, surfaces, and other abstractions of the mathematicians; for time and space are real and independent existences. They are not, indeed, "*substantial* existences," if "substantial" here means "material." But their existence is independent and necessary, inasmuch as we not only *conceive* of their separate existence, but we *believe* it, and cannot help believing it. The reality of pure space, extending without limitation beyond the bounds of our existing universe, is as clear a belief as any that can be present to the mind; it is even a necessary belief, which that in the reality of the universe is not, for I can conceive of the non-existence of matter, but I cannot conceive of the non-existence of space. And so of time. On the other hand, lines, surfaces, and angles are *mere* abstractions, which we can indeed conceive separately, but which we cannot conceive *as existing separately*, their independent existence wholly transcending the power of thought. Existence cannot be affirmed of them, but only of the bodies, or of the pure space, to which they belong.

Accordingly, we should rank time and space, along with minds and bodies, as *realities of being*. Lines, angles, &c. should be classed with justice, virtue, and the like, as abstractions, or, if such phraseology be preferred, as *realities of truth;* while the axioms of knowledge certainly should not be ranked under either of these heads, but should form a third class. These are not *realities* of either sort, but they are *truths;* they are not conceptions, but judgments.

The distinction here adopted by Dr. Wilson seems to coincide very nearly with that proposed by Hume, but to be less definite, and to be expressed in language far more ambiguous. Hume divides all things knowable into two classes, *relations of ideas* and *matters of fact;* all abstractions come under the former denomination, all actually existing objects and all

events, under the latter. This distinction is at once precise and unambiguous, while a volume would be needed to expose all the ambiguities which lurk under the terms *real*, *actual*, *reality*, &c. Reality can be affirmed of a tree, a government, a virtue, or an angle, but of each in a different sense; and the confusion surely will not be cleared up by trying to reduce all the different kinds of reality to two.

It is only in the Preface, and in a brief introduction to his work, that our author enters into any discussion of the nature of logic, of the limitations of its province, and of the common objections to the study of it which are founded upon misconceptions of these two points. Because these objections and misconceptions are so common, and are sanctioned by so high authority as that of Locke, Reid, Stewart, and John S. Mill, we should have been glad to see them considered at greater length; for science cannot advance, nor can the portion of it which is already determined be successfully taught, unless its objects are defined with the utmost precision, so that it can be relieved from the unjust reproach of failing to accomplish what it never even professed to perform. Having already touched upon this portion of the subject, we cannot resume it at length; but there is one objection, more frequently and pressingly urged than any other, which merits some comment.

"It must be granted," says Mr. Mill, "that in every syllogism, considered as an argument to prove the conclusion, there is a *petitio principii*." For, he argues, we cannot syllogistically prove that *the Duke of Wellington is mortal*, except by previously assuming that *all men* (the Duke of Wellington himself included) *are mortal;* and having assumed thus much in the major premise, the conclusion is no proper inference, no affirmation of a new truth, but only a repetition of what we have just taken for granted. Hence, it is argued, "no reasoning from generals to particulars can, as such, prove anything; since from a general principle you cannot infer any particulars, but those which the principle itself assumes as foreknown."

De Morgan answers this sophistry by saying: "Inference does not *give* us more than there was before; but it may

make us *see* more than we *saw* before." And again: "It is not that the consequence follows from the premises, but that *our perception* of the consequence follows our *perception* of the premises," which makes the reasoning valid and useful. Thus, the whole science of geometry, which contains so many and so recondite truths, that very few even of the professed mathematicians are acquainted with all of them, is certainly *contained in*, that is, is necessarily *deducible from* a very few axioms and definitions, which are so simple and obvious, that the learner often smiles contemptuously when he first hears them announced. De Morgan adds: "Persons not spoiled by sophistry will smile when they are told, that, knowing *two straight lines cannot enclose a space*, *the whole is greater than its part*, &c., they as good as knew that *the three intersections of opposite sides of a hexagon inscribed in a circle must be in the same straight line*. Many of my readers will learn this now for the first time"; and, he continues, with his customary insufferable air of smartness and triumph: "It will comfort them much to be assured, on many high authorities, that they virtually knew it ever since their childhood. They can now ponder upon the distinction, as to the state of their own minds, between virtual knowledge and absolute ignorance."

But we go much further. It is not true that the particular truth is always affirmed, or recognized by the mind, before the general truth is admitted. In most cases, no doubt, the general maxim is the result of our previous examination of all the particulars; we affirm of *all*, because we have already satisfied ourselves of *each*. In these cases, the general truth is obtained by induction. But sometimes this process is reversed; the universal maxim is sometimes obtained, not by induction, but by general considerations, or *a priori* reasoning. Then, we may save ourselves the trouble of examining the particular case, and at once affirm the particular as a (logical) consequence of the universal truth. It is not by induction, by actually measuring *all* triangles, that the mathematician becomes convinced that "the three angles of any triangle are equal to two right-angles." But having previously established this general truth by demonstrative reasoning, he immediately affirms it of any particular triangle which

he may be considering, though he has not measured it, and though, by the nature of the case, — that is, by the inaccessibility of the angles, — it is impossible that it should be measured. The astronomer erects a triangle having for its basis the diameter of the earth's orbit, and for its apex the position of the nearest fixed star; and having actually measured the two angles at the basis of this immense figure, he immediately deduces from the general proposition just mentioned the size of the angle at the apex, and the distance of that apex from the earth, two quantities which it is evidently impossible to measure directly. So, also, the skilful mathematician demonstrates the impossibility of squaring the circle, and then immediately rejects any pretended solution of the problem which is offered to him, without needing to examine and confute the fallacious reasoning adduced in its support.

The utility of *the study* of logic, considered as a branch of academic discipline, seems to us to depend on the fact, that it fastens the learner's attention closely upon the main points of the argument, or the logical train of thought, in everything which he reads or hears, and teaches him to subject this to a rigid process of analysis, which lays bare any sophistry that it may contain. He is thus led to neglect, or to rate at their proper value, the verbiage, the irrelevant matter, the unnecessary amplification, the appeals to the passions, and all the other arts of the sophist and tricks of the rhetorician and blunders of the sciolist. He thus has a divining-rod put into his hands, which saves him from the risk of digging where no water is to be found. Logic does not directly teach us how to reason well; it is only a generalization of the forms and a specification of the laws under which all good reasoning must exist. But indirectly this science is of the highest utility as an art; the habit acquired by the frequent practice of logical analysis and the constant application of logical rules is invaluable in all study and investigation. We do not deny that some persons reason well who have never acquired this habit, just as they often write well though they may never in their lives have opened a book on grammar. But as a general rule, the elements of a correct style are not given by inspiration, nor are long trains of consequences de-

duced with precision and accuracy from a few premises, by intuition. Reasoning is not, as some worthy persons seem to imagine, merely a weapon of disputation, whose sole or chief use is in controversy. It is the only organon for the discovery of all truth which lies beyond the narrow precincts of direct observation and experiment; and even observation and experiment, as we have already shown, cannot be practised to any good purpose, or made the basis of anything except the shallowest empiricism, unless they are forearmed and guided by sagacious anticipations and correct logic. The study is not without its effects upon the style of those who are proficients in it. By fastening attention upon the matter rather than the manner, upon the evolution of thought rather than the display of words, it leads to the formation of a compact, nervous, and pointed style, which is the very opposite of the shallow diffuseness, the rambling and ill-jointed rhetoric, which is now so much in vogue. Far the most forcible and concise writers of the present day in Great Britain are Dr. Whately, Sir William Hamilton, and Professor De Morgan, all of whom are best known, in this country at least, by their contributions to logic. We are happy to add, that the style both of Mr. Tappan and Dr. Wilson is marked by the same characteristics.

ART. VI. — *Works of* BENJAMIN FRANKLIN. Edited by JARED SPARKS. In Ten Volumes. A New Edition. Boston: Whittemore, Niles, and Hall. 1856. 8vo.

SIXTY-SIX years have elapsed since the mortal remains of Benjamin Franklin were placed beneath a tablet in the Friends' Cemetery in Philadelphia; the granite obelisk which marks the last resting-place of his parents is a familiar object to all who walk the streets of his native city; but these graves, thus humbly designated, were, until a few days since, the only visible monuments of a name as illustrious as it is